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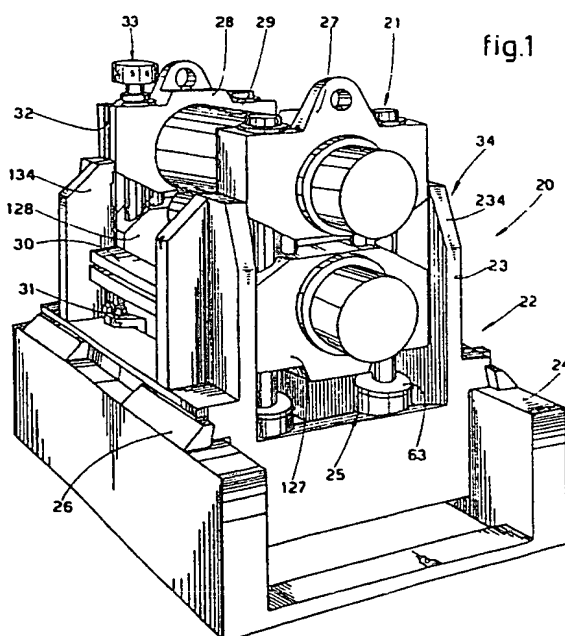
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(54) Stand for stationary rolling line.

(57) The invention concerns improvements to stands (20) in stationary rolling lines, comprising two rolls (29) superimposed with a horizontal or upright axis, whereby said rolls (29) are of a replaceable type, said improvements comprising, in coordinated cooperation with a pack unit (21) of rolls (29) complete with housings (27) and means to uphold and position (30) the rolling equipment and able to be dismantled and re-installed by simple withdrawal and reintroduction, one or more of the following: means to adjust axially the upper roll: means to swing at least one housing (27), being placed advantageously on a plane passing through the lengthwise axis of the roll (29): means for lengthwise positioning and guiding present in the supports (34) of the housings (27-28) and in the housings (28) located at one side of said pack unit (21): bearing structure means (22) with means to adjust the rolls: means for lengthwise positioning (25-24-26) and means (34) to support the rolls: and means for simultaneous coupling-uncoupling of the extensions. The invention also concerns the stands in stationary rolling lines which adopt one or more of said improvements.



## TITLE MODIFIED

see front page

## 1. Description of the invention entitled:

"Improvements to stands in stationary rolling lines, and  
stands in stationary rolling lines thus improved"

in the name of DANIELI & C. Off.Mecc. S.p.A. at BUTTRIO

5. submitted on

under No.

This invention concerns improvements to stands in stationary rolling lines; to be more exact, the invention concerns improvements to two-high stands, the rolling line being kept stationary. The invention also concerns two-high stands in stationary rolling lines.

The invention refers in particular to horizontal and/or upright two-high stands wherein the rolls group can be dismantled and replaced quickly.

15. To be more precise, the invention refers to a two-high stand with a stationary or substantially constant rolling line wherein the rolls together with the housings can be removed and replaced.

The invention envisages a plurality of improvements which can be adopted partly or wholly in a two-high stand, and therefore envisages a two-high stand in which one or more of the improvements according to the invention are adopted.

25. The first relevant improvement according to the invention consists in having embodied the rolls group as one

Gilberto Petraz

1. single, compact assembly, complete with housings and rolling equipment and able to be dismantled and reassembled as one single unit.

The very great advantages which this improvement offers are evident, as follows:

- Ease and speed of replacement of the rolling unit.
- Ability to carry out simplified maintenance in suitable places.
- Ability to fit out the unit previously elsewhere.
- 10. - Reduction in the costs of investment and operation.

These and yet other advantages arise from said improvements. To bring this about, steps have been taken to embody a two-high stand with supports for the housings which also act functionally as standards, the bearing frame being reduced to a service unit for the positioning and adjustment controls.

A further improvement rise in the operating ability to use the supports of the lower and/or upper housings as means for anchoring the platform that upholds and positions the rolling equipment.

A variant of this improvement envisages the anchoring of said platform that upholds and positions the rolling equipment, on a support anchored to the connecting sleeve between the supports of the housings.

25. The advantage provided by these improvements is obvious, for they make possible the perfect equipping of a unit in the specific shop concerned and not in the rolling line, with a clear gain in the time and quality of the work and its outcome.

30. A further improvement springs both from the fact that such a single unit is steered and positioned lengthwise by guides cooperating with the supports of the housings of only one side, the supports of the other side being free to slide

*Gilberto Petraz*

1. lengthwise, and also from the fact that such a unit allows .  
said guided supports to be able to swing within a desired .  
arc.

This improvement is highly relevant inasmuch as its .  
5. allows straight roller bearings to be used and also permits  
bending in the structure of the rolling unit, this bending .  
being absorbed directly by the structure of the unit itself  
without the structure of the sustaining, adjusting and po- .  
sitioning framework being affected. This enables the highest  
10. rolling pressures and the longest working life of the roller  
bearings fitted to be attained.

Moreover, by permitting the employment of two thrust .  
bearings, one for each roll, the invention enables the axial  
thrusts generated even during the rolling of structural sec-  
15. tions to be sustained and thus makes it possible to obtain  
more perfect finished products.

A further improvement is offered by the system for .  
bearing the unit on the framework. This system visualises .  
not only self-alignment during installation but also envis-  
20. ages the unloading of the force of weight and the vertical  
forces in a direct way such as to obviate anomalous stresses  
in the rolling unit.

The advantage of this improvement is clear, in that it  
enables the whole structure of the unit to be lightened by .  
25. creating elements which are specialised structurally and  
functionally and which are suitable for their specific tasks.

Furthermore, the system for disconnecting and reconnect-  
ing the extensions is an important improvement since the  
extensions are actuated simultaneously by a U-shaped element  
30. operated by suitable means such as jacks or linearly actuat-  
ing screws.

This improvement is important in that it enables the  
extensions to be kept positioned on the bearing structure.

1. thus obviating unnecessary repetitive operations.

The invention also envisages other improvements which will become clear hereinafter in the description.

The invention, therefore, visualises improvements to stands in stationary rolling lines, said stands comprising two rolls superimposed with a horizontal or vertical axis, whereby the rolls are of a replaceable type, said improvements being characterised by comprising one or more of the following, in coordinated cooperation with a pack rolling unit complete with housings and with means to sustain and position the rolling equipment, said unit being able to be removed and reinstalled by simple extraction and reintroduction:

- means for axial adjustment of the upper roll,
- 15. - means for swinging at least one housing, said means being positioned advantageously on a plane passing through the lengthwise axis of the roll,
- guide means for lengthwise positioning, located in the supports of the housings situated on one side of said pack unit,
- 20. - bearing structure means with means for adjusting the rolls,
- means for their lengthwise positioning and means for sustaining the rolls,
- and means for the simultaneous anchoring and releasing of the extensions.
- 25.

The invention also refers to stands in stationary rolling lines, whereby said stands comprise two rolls superimposed with a horizontal or vertical axis and said rolls are of a replaceable type, said stands being characterised by including in coordinated cooperation a pack rolling unit complete with housings and with means to sustain and position the rolling equipment, said unit being able to be removed and reinstalled by simple extraction and reintroduction,

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*Gilberto Petr*

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- 5 -

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1. whereby said stands adopt one or more of the improvements proposed.

With the help of the attached tables, which are given as non-restrictive examples, let us now see a preferential solution of the invention. The tables show the following:

- Fig.1 shows a rolling stand according to the invention;
- Fig.2 shows the pack unit;
- Fig.3 shows the bearing structure means;
- Fig.4 gives a variant of the unit of Fig.2;
- 10. Fig.5 shows a diagram of the vertical adjustment of the rolls and the control of the extensions;
- Fig.6 shows half a stand cut away vertically along an adjustment cotter means;
- Fig.7 gives an upright lengthwise section of the stand;
- 15. Fig.8 shows the means upholding the rolls and the clamping means;
- Fig.9 gives a variant of Fig.8;
- Fig.10 shows the variant of Fig.9 along the section AA;
- Fig.11 gives a front diagrammatic view of the means for simultaneous anchoring and releasing of the extensions;
- 20. Fig.12 gives a detail of Fig.11 according to a horizontal section;
- Fig.13 shows a variant of Figs. 8 & 9;
- Fig.14 shows a stand with vertical rolls according to the invention.
- 25.

With reference to the figures, the same parts or parts performing the same functions bear the same reference numbers.

A plurality of the figures shows a horizontal stand, but the latter can be embodied in a vertical form, as in Fig.14. In the tables we have the following.

Fig.1 shows a two-high stand 20 in a stationary rolling line, consisting of a pack unit 21 and structural bearing means 22. The structural bearing means 22 comprise the basic

1. frame 24, which supports and guides the vertical and lengthwise positioning means, which can be anchored to the supporting and guiding base 24 with clamps 26 actuated mechanically or hydraulically in a known manner.

5. On the vertical and lengthwise positioning means 23 are envisaged the groups 25 which, in our example, contain the means upholding the rolls 34-I34 and the means to adjust the rolls 88.

10. Of the four standards 34 which rise above the vertical and lengthwise positioning means 23, one pair I34 has up-right guides whereas the other pair 234 has a flat guiding surface.

The two standards I34 include some guides 35 which cooperate with the grooves 32 present in the upper and lower housings 28, whereas the upper and lower housings 27 have smooth sides so as to be suitable for cooperating with the pair of standards 234. The guides 35 and grooves 32 constitute the lengthwise positioning and guide means 87 present in one pair of standards I34 and in one pair of housings 28.

20. The rolls 29 are located between the housings 27 & 28 and are upheld and positioned thereby.

One or more visual means 33 may be present on a housing so as to read the value of the adjustment.

25. As indicated hereinafter, means 30 to support and position the rolling equipment are envisaged as being between the housings I27 and I28. The screw means 31 can be used for the vertical adjustment of said means 30.

For the actuation of the means located in 25 that position the rolls vertically, the handwheel 60 or motor means or geared motor means (not shown here) can be used but are not relevant to the purposes of the invention.

The guides 35 integral with the standards I24 cooperate with the grooves 32; said guides 35 have a length which is

25.05.81

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1. advantageously less than that of the grooves 32, so that  
. the swining means 39 can be fitted. Said means 39 for swing-  
. ing the housings 28 and I28 consist of cotter means (here  
. consisting of an adjustable screw) and of a rounded guide  
s. block 4I.

. The guide block 4I can protrude into the groove 32 or  
. can be inserted at least partially into a suitable seating  
. machined in the housing beside the groove 32. The guide 35  
. is introduced between the cotter means 40 and the guide  
10. block 4I. The cotter means 40 and guide block 4I lie on a  
. plane passing through the axis of the roll 29.

. For the lengthwise positioning of the two rolls 29-I29,  
. so as to make their grooves mate together, there are employ-  
. ed the lengthwise positioning means and means for axial ad-  
15. justment of the upper roll 36, which act in our example on  
. the upper roll 29. Said positioning means 36 can be actuated  
. with the handwheels 37 and 38, as will be seen better here-  
. inafter.

. The upper housings 28 and 27 include suitable eyelets  
20. 42 for attachment to lifting means.

. The means 30 for supporting and positioning the roll-  
. ing equipment can also be installed on auxiliary supporting  
. and clamping means 43, as can be seen in the example of Fig.  
. 4. Said auxiliary supporting and clamping means 43 are an-  
25. chored in a middle position, in cooperation with the protect-  
. ive sleeves 46, between the upper 27-28 and lower I27-I28  
. housings. Said supporting means 43 have an offshoot 44 that  
. extends inwards between the housings with a guide onto which  
. the means 30 are secured.

30. The adjustment means 3I can be of the type of Fig.2 or  
. of Fig.4 or of any other desired type..

. In the variant of Fig.4 the supporting means 43 have a  
. suitable projecting ridge 45, which cooperates with a slid-



ing means 47 actuated in our example by the jack 48 solidly fixed to a standard 34, so as to form the means 49 clamping the pack unit 2I when the latter has been inserted into the bearing structure means 2I.

Fig.5 shows diagrammatically the means for adjusting the rolls 29 and the drive system employing extensions 56.

By acting on the lever 60 or on the motorized means that replaces it or integrates it, the shaft 50 is made to rotate in the required direction and the worm screws 5I-I5I are thus set in rotation.

The possible presence of an intermediate joint which can be introduced or removed as wished and which is placed between the two worm screws 5I-I5I enables the extent of adjustment to be increased.

The worm screws 5I-I5I actuate the toothed wheels 52-I52 that set the shafts 53-I53 in rotation. When the pack unit 2I is installed, the shafts 53-I53 are connected to the adjustment axles 54-I54, which comprise the screws 55-I55. Said screws 55-I55 cooperate with threaded means 59 in the housings 27-28 so as to position the latter.

Instead of the aforesaid intermediate joint, the system of Fig.7 can be embodied wherein the shaft 50 passes inside the shaft I50, and both shafts can be connected together with the pin 260 which connects the crank 60 to the disk I60. If the crank 60 and disk I60 are connected, the two screws 5I-I5I work together; otherwise only the screw I5I works.

The joint 360 can be envisaged if it is wished to motorize the shaft 50, that is to say, if it is wished to fit a drive group to obviate use of the crank 60.

As can be seen in Fig.7, the housing 27-28 are connected by stays with pins 58.

To adjust or position the roll 29 lengthwise in respect

1. of the lower roll I29, the handwheel 38 is slackened off, .  
2. so that the ring nut controlled thereby unlocks the anchor-  
3. age ring nut 62 controlled by the handwheel 37; next, the .  
4. handwheel 37 is operated, and the ring nut 62 is moved back-  
5. wards or forwards, cooperating thereby with the fixed ring .  
6. nut I62 solidly secured to the housing 28, which draws with  
7. itself the roll 29 in a known manner, namely by drawing a .  
8. bearing solidly fixed axially to the roll 29. When the roll  
9. 29 has been positioned, the ring nut of the handwheel is re-  
10. clamped.

1. As said earlier, motion is taken from the toothed wheels  
2. 52 to turn the shafts 55. Between the toothed wheel 52 and .  
3. shaft 55 there is a connecting joint, the whole being con- .  
4. tained in the means 25, which also contain the clamping  
5. means 73 in the example of Fig.8. The joint consists of a .  
6. frontal joint 65 which permits the terminal portion 55 to .  
7. mesh with the upper part of the shaft 53. The upper part of  
8. the shaft 53 also comprises a housing within which is lodged  
9. the tapered alignment element 66. Below the tapered element  
10. 66 there is the projection 67, which acts as a foot.

1. The whole is contained within the means 25, which are .  
2. covered during the working phase by the cover 63 solidly  
3. fixed to the shaft 55.

1. The end portion of the shaft 55 has a recess or protru-  
2. sion 64, within which is lodged the tooth 69 that clamps the  
3. shaft 55 to the shaft 53 but permits the joint rotation of .  
4. the shafts 55 and 53. The recess or protrusion 64 can be  
5. stationary or rotating on the axle 54.

1. The tooth 69 is retractable and is advantageously thrust  
2. elastically by the means 71 and can be operated by hand (for  
3. instance, with the means 72 which also permit clamping) or .  
4. with the jack I72.

1. The shaft 53 is advantageously bored axially 68 so as .

1. to enable the upper seatings to be cleaned automatically. .

Fig.9 includes two variants of Fig.8. In said variants  
in Fig.9 the clamping means 69, being operated by means 272-  
372 which in the example shown are jack means 83, act on  
5. the groove 64 present below the gear wheel 52. .

If fluid under pressure is delivered through I84, the  
chamber I85 is filled and the means 69 are clamped, whereas  
if the fluid is sent through the duct 84, the chamber 85 is  
filled and the means 69 are unclamped. This is so because  
10. the plunger 86 is solidly fixed to the body 372 of the clamp-  
ing means 69. With this system a more precise and accurate  
alignment is obtained and the organs are less heavily stres-  
sed. .

In the lay-out shown in Fig.I3 the tooth 69 clamps the  
15. shaft 55 to the shaft 53 by means of a bush 264 containing  
a rolling bearing which permits the joint rotation of 55,52  
and 53 through the frontal toothing 65. This solution chang-  
es the sliding friction of 69 and 55 into rolling friction  
when the stand is in a vertical position. .

20. Fig.II and I2 show the simultaneous uncoupling-coupling  
means 89 of the extensions 56-I56. A substantially U-shaped  
element 74 encloses the two extensions 56-I56 at their sides  
and supports and positions them. .

The end part of the extensions 56 has a collar 75 which  
25. can be engaged in a swinging manner in the U-shaped element  
74 (Fig.I2). .

The U-shaped elements 74 can run on guides 8I or on  
other guides prearranged for the purpose and anchored to  
the body 23. .

30. If the jack 80 is operated, the U-shaped element 74 is  
brought towards the structure 23 or is taken away therefrom.  
When it is taken away, the U-shaped element 74 moves back-  
wards the collar 75, which drags with it the toothed sleeve

1. 76, of which the spherical toothing is meshed with the sleeve  
. 78 and allows the shaft 77 to swing within a certain angle .  
. in respect of the axis of the roll 29.

. The sleeve 76, when it withdraws, takes with it the .  
5. sleeve 78 as well, and when the peripheral toothing of the .  
. sleeve 78 becomes disengaged from the toothing on the ring .  
. 79 mounted on the roll 29, the extension is free.

. The reverse operation takes place during reinstallation.  
. Instead of the jack 80 a screw mechanism 180 can be envis- .  
10. aged or another mechanism deemed suitable for the purpose .  
. and more satisfactory for the specific task.

. To dismantle the pack unit 2I, steps are taken to dis-  
. mantle the extensions 56-156; next, the housings 27-127-28-  
. 128 are opened slightly and a desired distancing means is .  
15. introduced within them; then the housings themselves are re-  
. closed until said distancing means is gripped. Then the .  
. blocks 69 or 49 are freed and the pack unit 2I can be with-  
. drawn.

. When the housings are to be dismantled, they can be .  
20. withdrawn sideways owing to the pre-arranged dimensions of .  
. the design.

. We have described improvements here and have shown some  
. solutions which can be adopted as examples. However, the pre-  
. portions and sizes can be varied, and it is also possible .  
25. to add, remove, integrate or replace parts; one or more of .  
. the proposed improvements can be adopted, as also can equi-  
. valent solutions, etc. These and other variants are possible  
. for a technician in this field.

C L A I M S

1. I. Improvements to stands (20) in stationary rolling lines, comprising two rolls (29) superimposed with a horizontal or upright axis, whereby said rolls (29) are of a replaceable type, said improvements being characterised by comprising one or more of the following, in coordinated co-operation with a pack unit (21) of rolls (29) complete with housings (27) and with means (30) to uphold and position the rolling equipment, said unit (21) being able to be dismantled and re-installed by simple withdrawal and re-introduction:
- means (36) to adjust axially the upper roll,
  - means (39) to swing at least one housing (27), being located advantageously on a plane passing through the lengthwise axis of the roll (29),
  - means (87) for lengthwise positioning and guiding, being present in the supports (34) of the housings (27-28) and in the housings (28) located at one side of said pack unit (21),
  - bearing structure means (22) with means (88) for adjusting the rolls,
  - means for lengthwise positioning (25-24-26) and means for supporting (34) the rolls,
  - and means (89) for the simultaneous coupling-uncoupling of the extensions (56).
2. Improvements to stands (20) in stationary rolling lines, as in Claim I, characterised by the fact that the means (36) for axial adjustment of the upper roll comprise in mutual cooperation and coordination
- a movable ring nut (138) with clamping functions screwed onto
  - an anchorage ring nut (62) which is anchored in a known manner to a bearing means solidly fixed axially to the roll (29) and which can be screwed onto

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1. - a fixed threaded ring nut (162) fixed solidly to the housing (28).

3. Improvements to stands (20) in stationary rolling lines, as in Claim I, characterised by the fact that the means (39) to swing at least one housing (28) are placed advantageously on a plane passing through the lengthwise axis of the roll (29) and comprise a rounded sliding block (41) and advantageously adjustable cotter means (40), which cooperate with the groove (32) present in the housings (28) and with the guides (35) present in the standards (34).

4. Improvements to stands (20) in stationary rolling lines, as in Claim I, characterised by the fact that the lengthwise positioning and guide means (87) present in the supports (34) of the housings (27-28) and in the housings (28) located on one side of the pack unit (21) comprise groove means (32) and guide means (35) cooperating with each other.

5. Improvements to stands (20) in stationary rolling lines, as in Claim I, characterised by the fact that the bearing structure means (22) comprise a base (24) to guide and uphold vertical and lengthwise positioning means (23), whereby clamp-type anchorage means (26) are present.

6. Improvements to stands (20) in stationary rolling lines, as in Claim I and Claim 5, characterised by the fact that the vertical and lengthwise positioning means (23) contain the drive groups (60-51-52-53) for vertical actuation of the rolls (29).

7. Improvements to stands (20) in stationary rolling lines, as in Claim I and in Claim 5 or 6, characterised by the fact that the shafts (53) of the drive groups comprise frontal coupling means (65) and alignment means (66) and cooperate with rotational clamping means (69-64) for vertical fixture of the adjustment axles (54).

1. 8. Improvements to stands (20) in stationary rolling .  
lines, as in Claims I & 5 and in one or another of the claims  
thereafter, characterised by the fact that, when the pack .  
unit (21) is dismantled, the adjustment axles (54) together  
5. with the end part (67) act as supporting feet.

9. Improvements to stands (20) in stationary rolling .  
lines, as in Claims I & 5 and in one or another of the Claims  
thereafter, characterised by the fact that the adjustment .  
axles (54) include at their end a recess or protrusion (64)  
10. which is stationary or rotates and with which a clamping  
tooth (69) cooperates.

10. IO. Improvements to stands (20) in stationary rolling .  
lines, as in Claims I & 5 and in one or another of the Claims  
thereafter, characterised by the fact that the vertical and  
15. lengthwise positioning means (23) include lateral guiding  
and positioning standards (34) which are separate at their  
top.

20. II. Improvements to stands (20) in stationary rolling .  
lines, as in Claim I, characterised by the fact that the  
means (89) for simultaneous coupling-uncoupling of the ex-  
tensions (56) comprise a U-shaped element (74) enclosing .  
within its sides at least part of the two extensions (56) .  
and supporting and positioning the same, whereby said U-  
shaped element (74) can be moved axially to the rolls (29) .  
25. with drive means (80), and whereby there are advantageously  
lengthwise guide means (81).

30. I2. Improvements to stands (20) in stationary rolling .  
lines, comprising two rolls (29) superimposed with a hori-  
zontal or upright axis, whereby said rolls (29) are of a re-  
placeable type, said improvements being characterised by ad-  
opting one or more of the improvements according to Claims .  
I to II inclusive.

I3. Improvements to stands (20) in stationary rolling .

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lines, comprising two rolls (29) superimposed with a horizontal or upright axis, whereby said rolls (29) are of a replaceable type, and stands (20) in stationary rolling lines comprising two rolls (29) superimposed with a horizontal or upright axis, whereby said rolls (29) are of a replaceable type, as in one or another of the Claims hereinbefore, as described and shown and for the purposes allowed.

10 .

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fig. 2

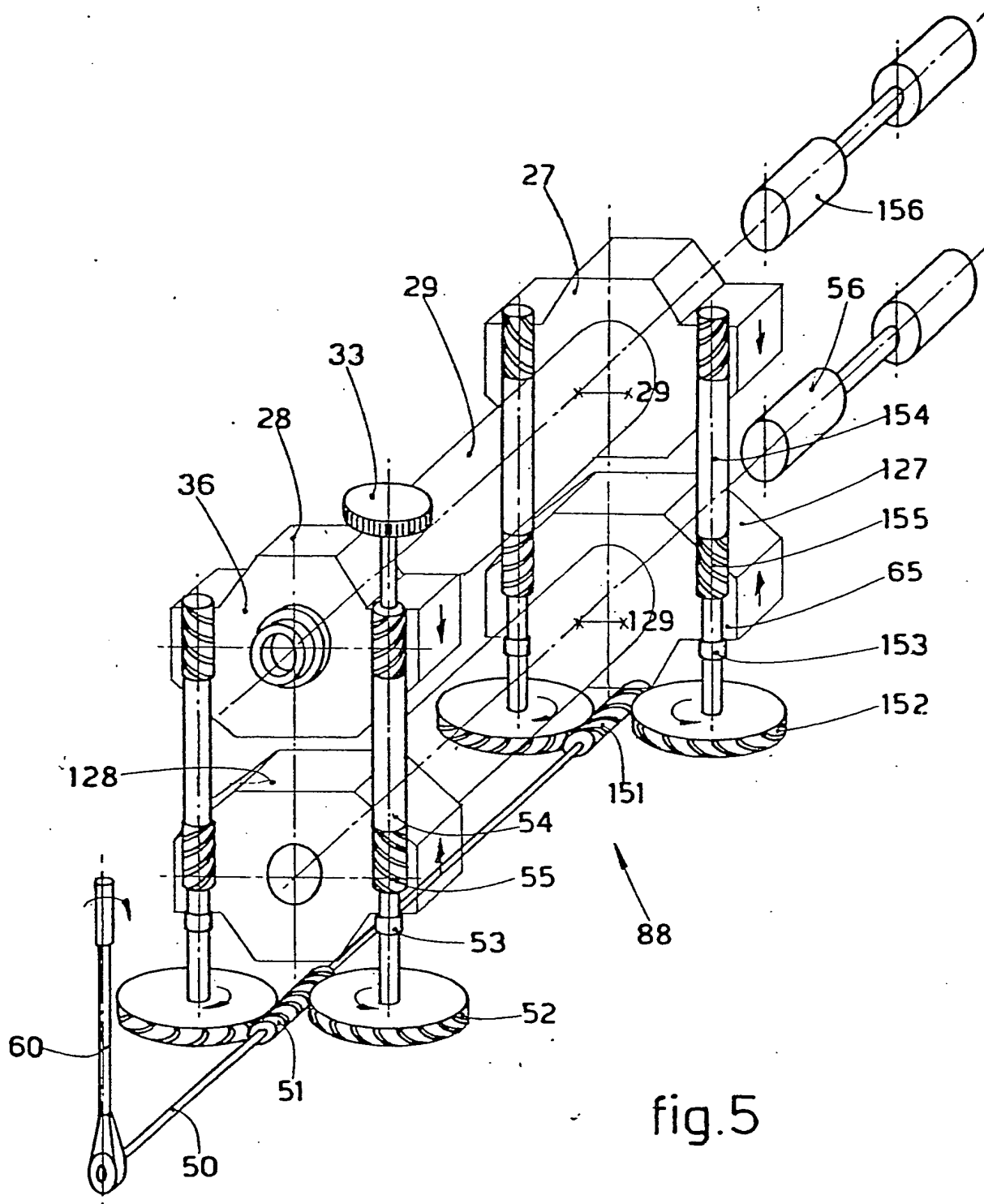


fig. 5

fig.6

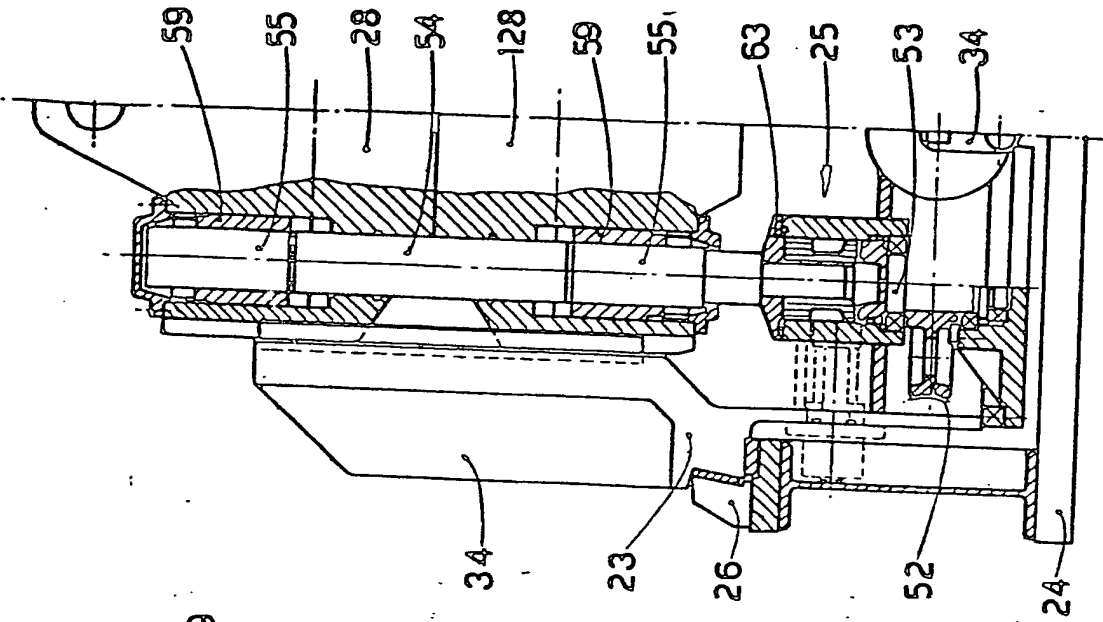
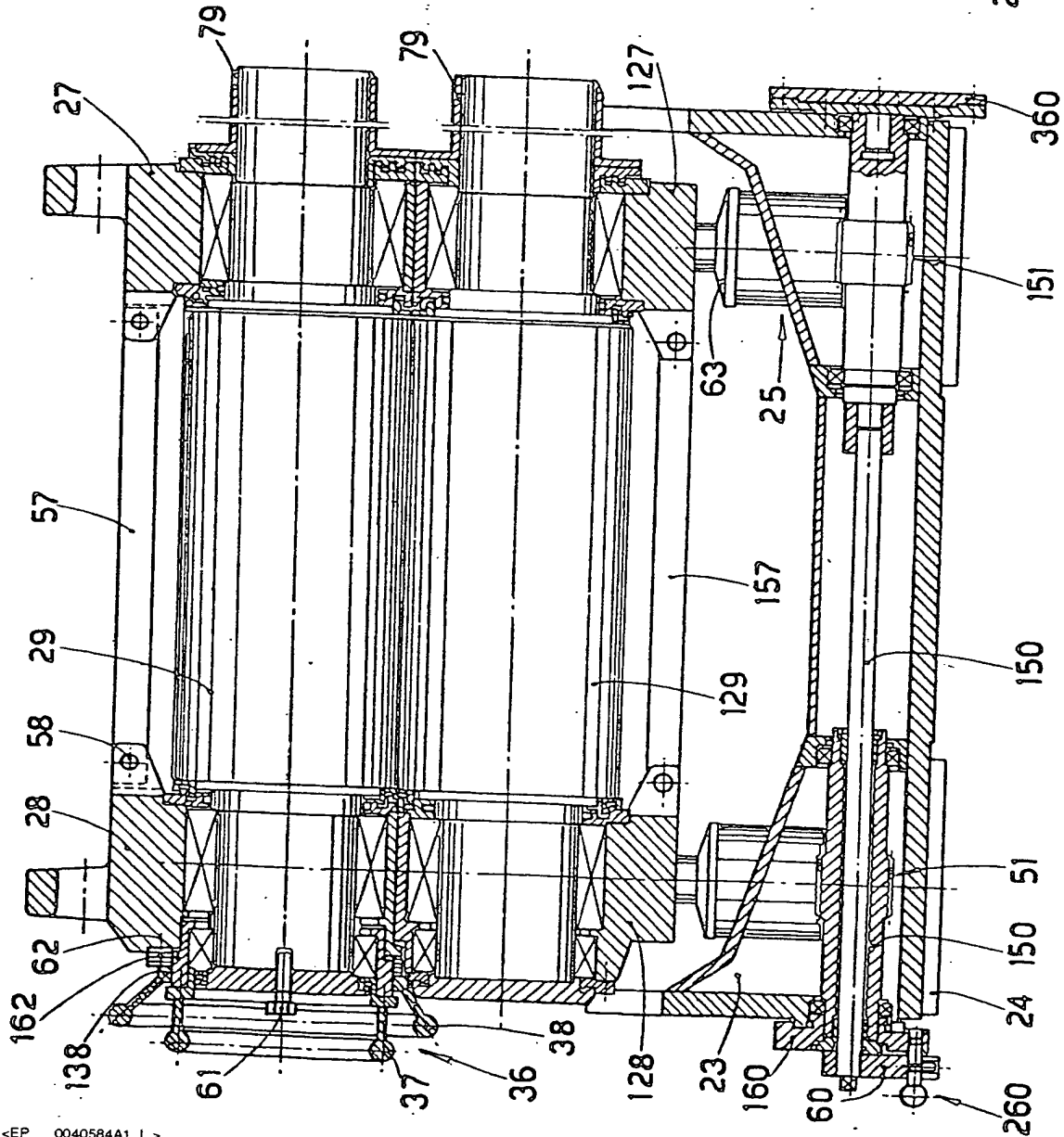


fig.7



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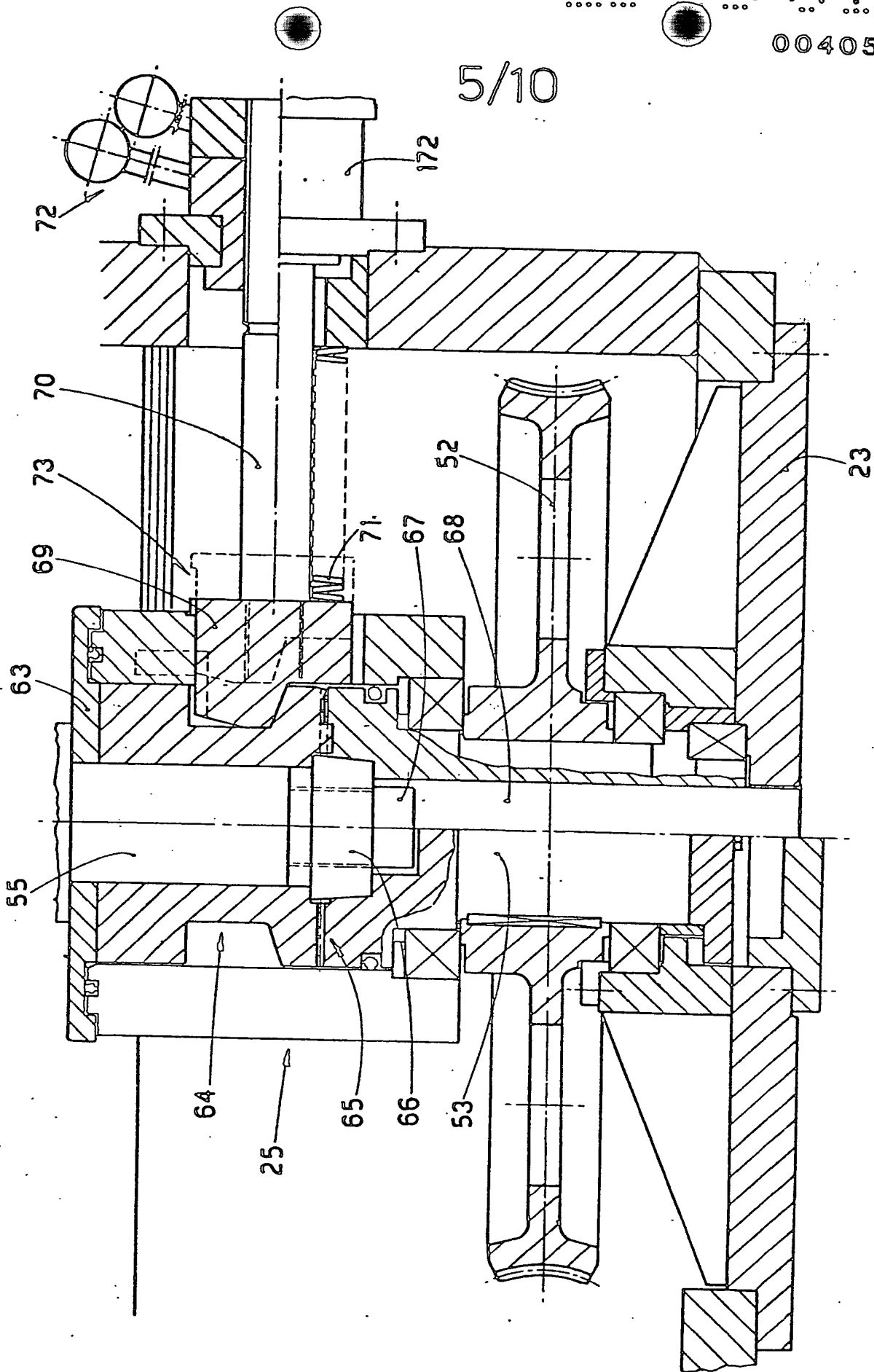
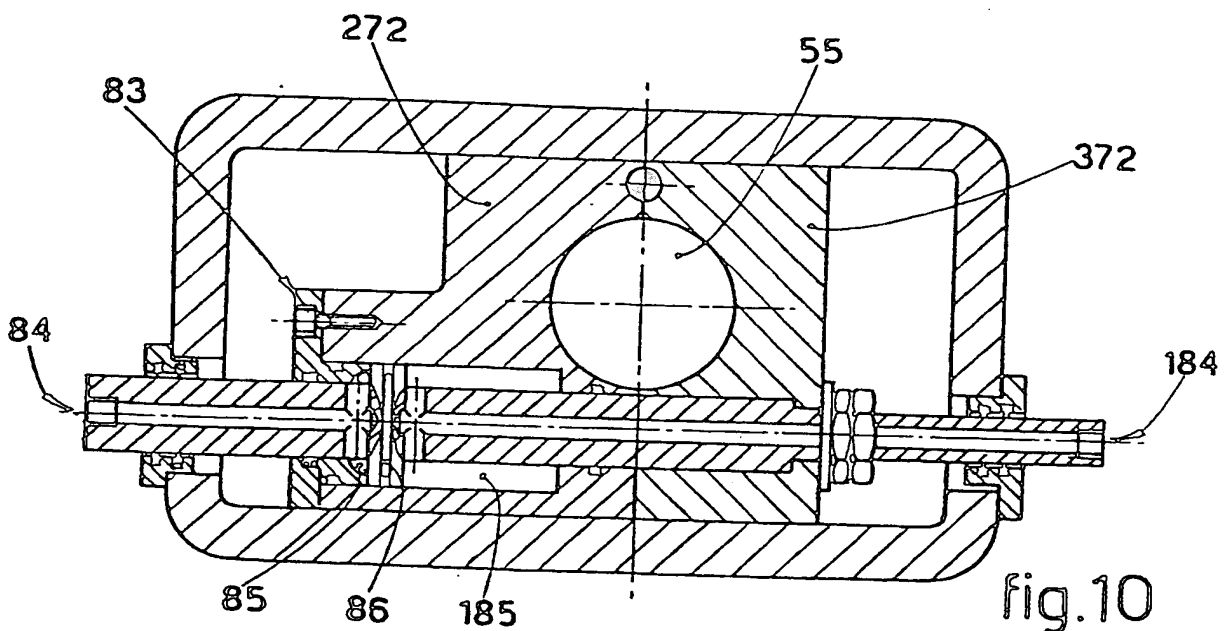
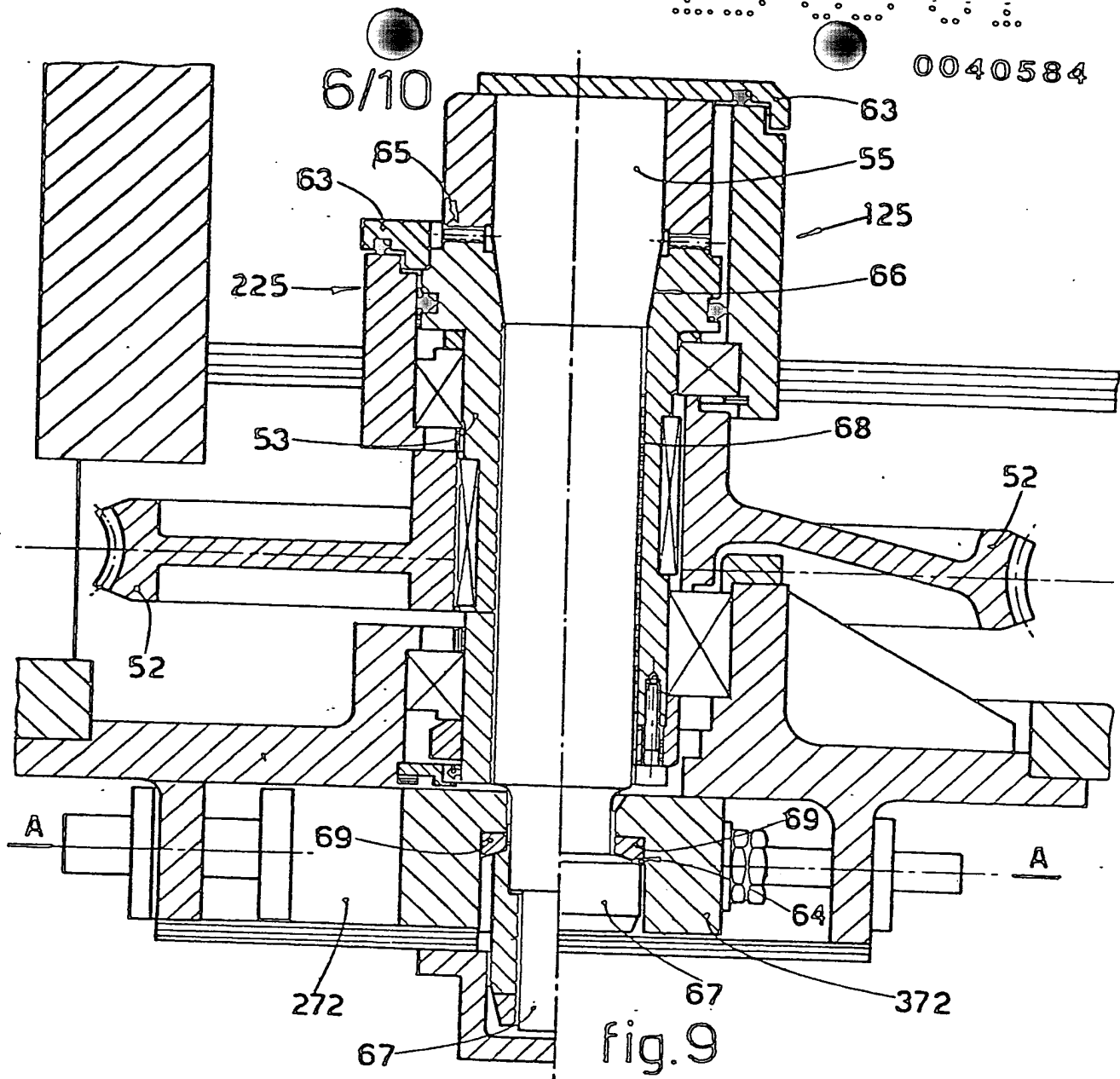
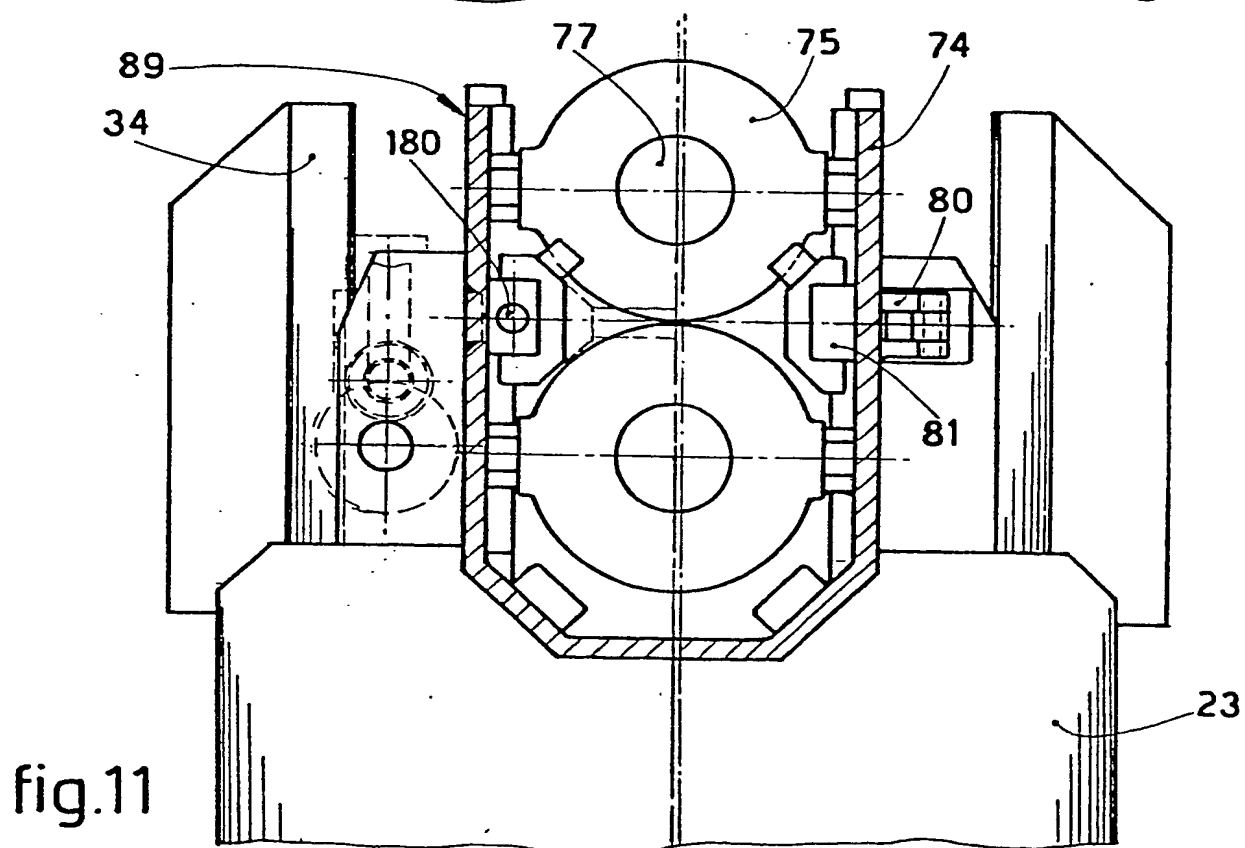
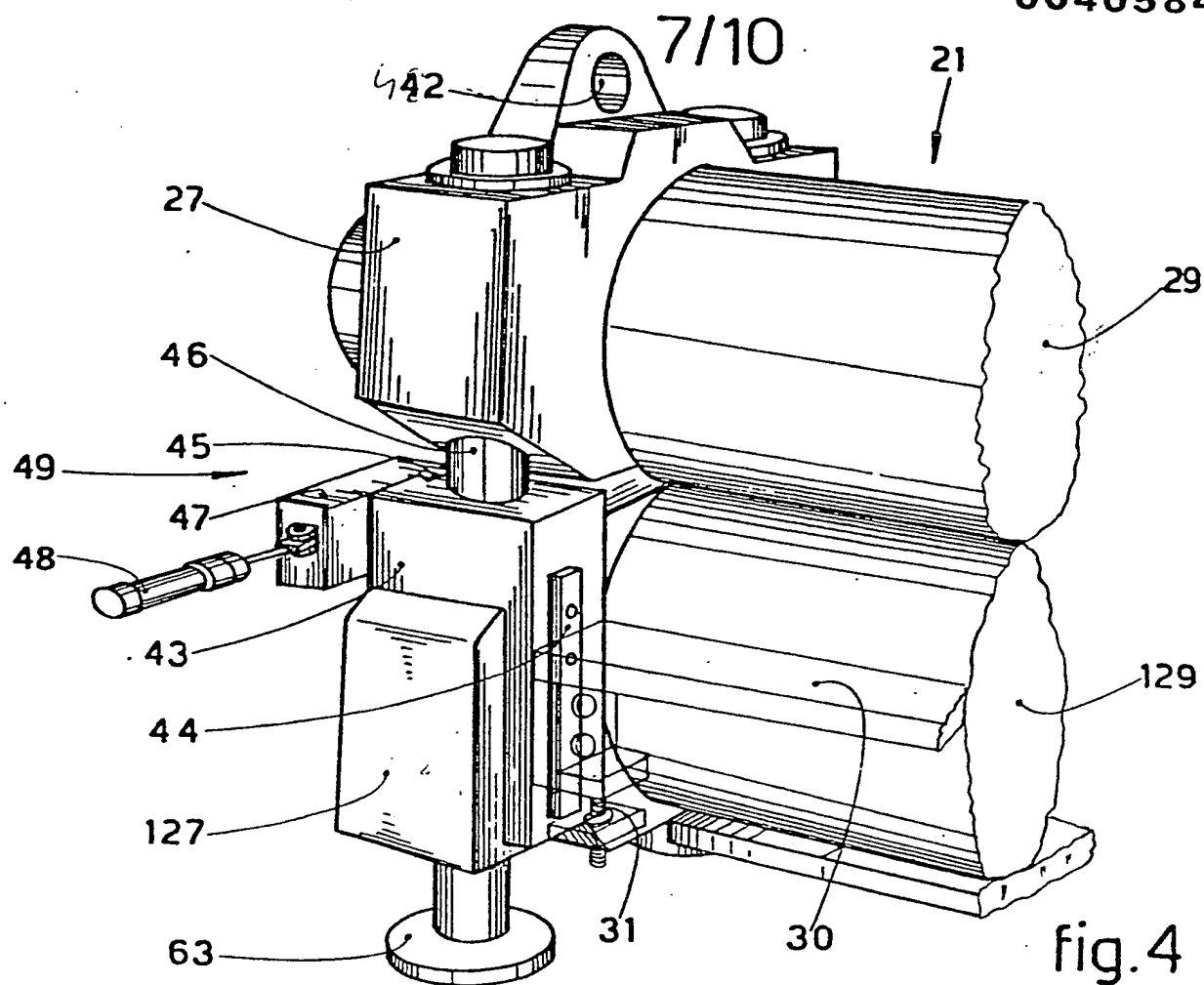


fig. 8

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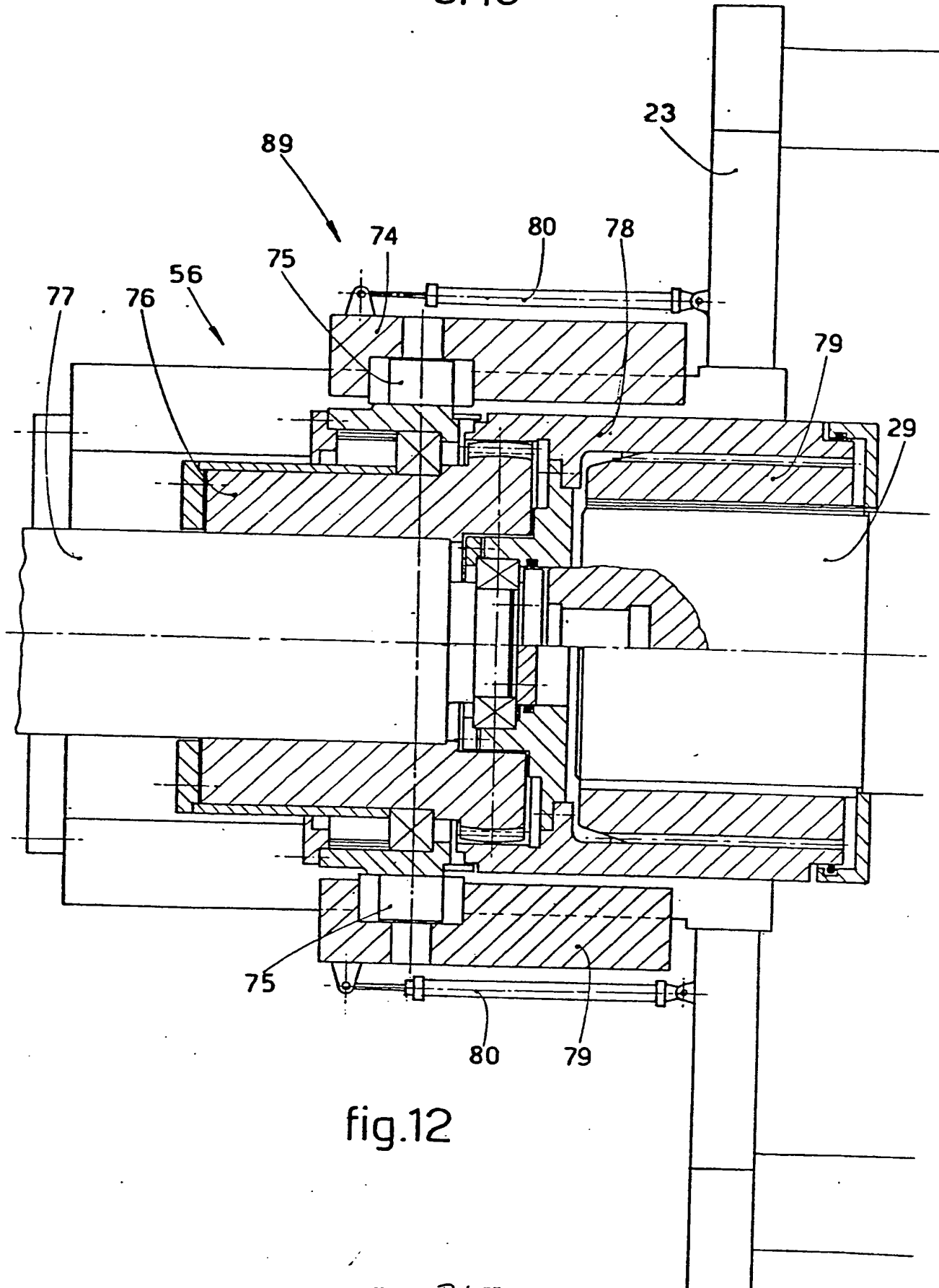


fig.12

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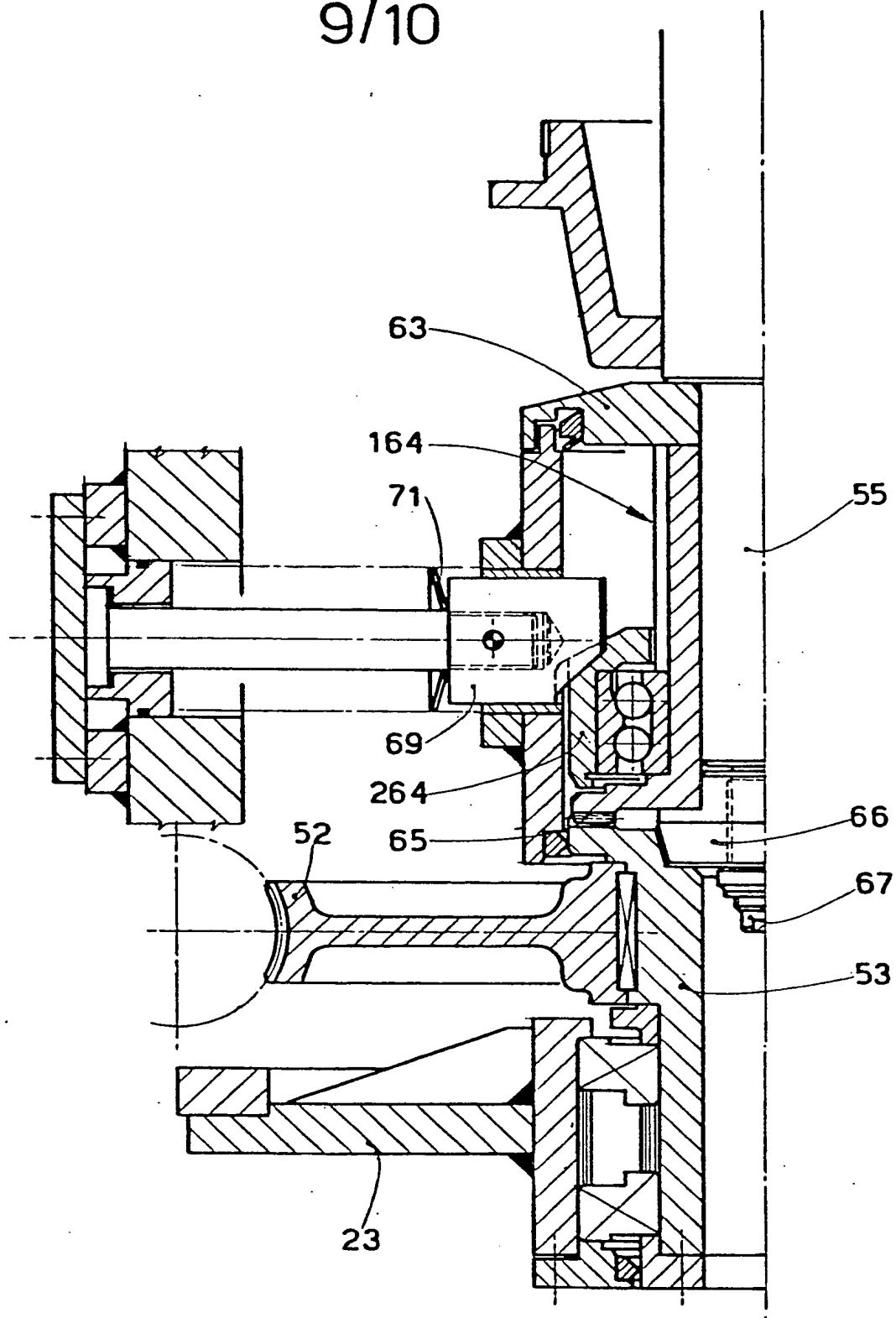


fig.13

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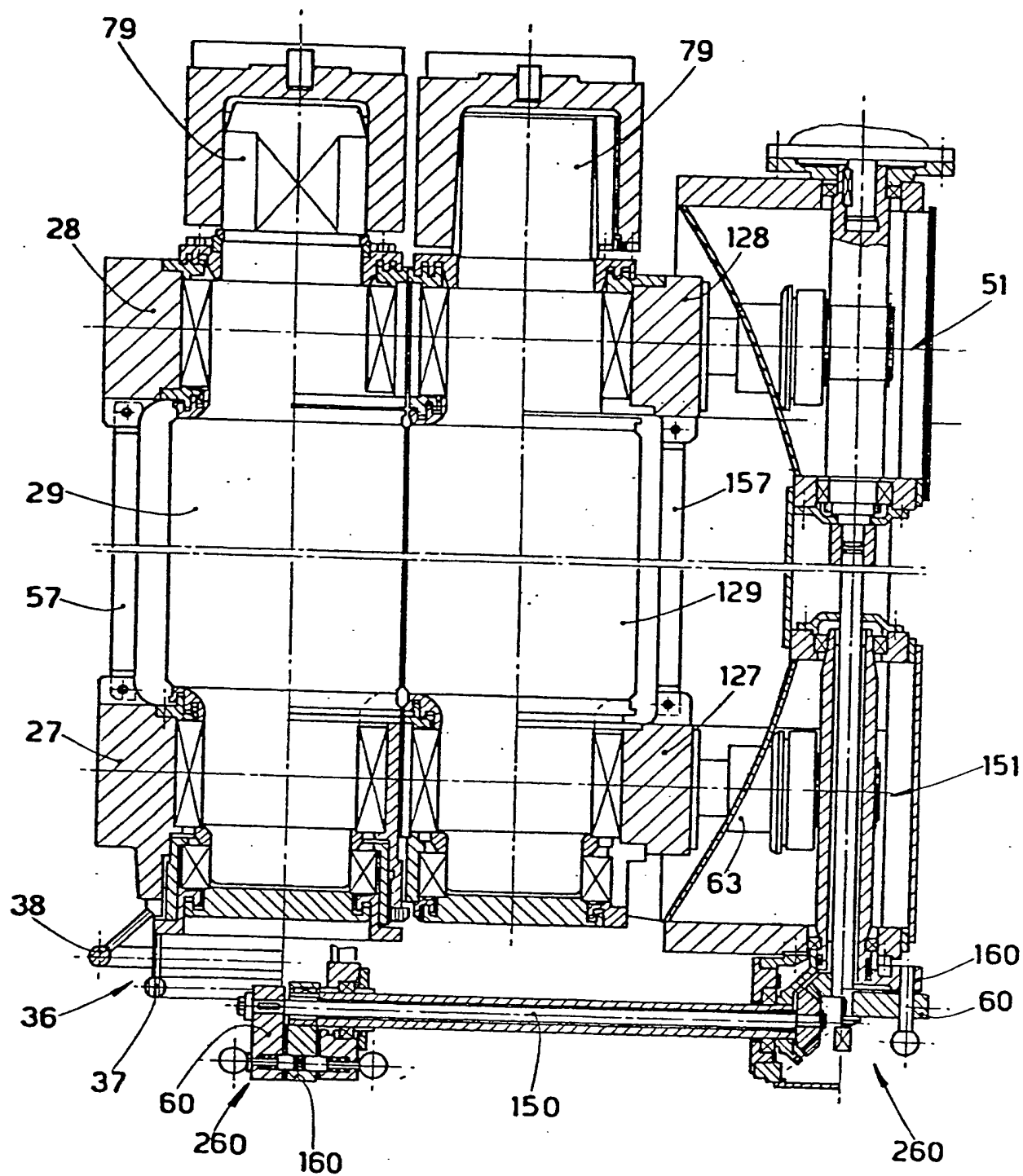


fig. 14

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European Patent  
Office

# EUROPEAN SEARCH REPORT

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Application number

EP 81 83 0048.5

DOCUMENTS CONSIDERED TO BE RELEVANT			CLASSIFICATION OF THE APPLICATION (Int. Cl.3)
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	
X	<u>DE - B2 - 1 939 485</u> (MOELLER & NEUMANN) * claims 1 and 2; column 4, lines 21 to 29; fig. 1 and 2 *	1,4,5 6	B 21 B 31/12 B 21 B 13/02
	<u>DE - B - 1 270 518</u> (MORGAN CONSTRUCTION CO.) * claim 1; fig. 2 *	1,4,5	
	<u>DD - A - 85 040</u> (M. BRAT) * page 4; fig. 3 *	1,4,5	
	<u>DE - U - 1 962 922</u> (SKF) * claim 1; fig. 1 *	1,2	TECHNICAL FIELDS SEARCHED (Int. Cl.3)  B 21 B 13/00 B 21 B 31/00
	<u>DE - B - 1 259 818</u> (MORGAN CONSTRUCTION CO.) * claim 1; fig. 1 *	1,2	
	<u>DE - C - 957 930</u> (SCHLOEMANN) * claims 1 to 3; page 3, lines 35 to 44; fig. 1 and 3 *	1,4,5	CATEGORY OF CITED DOCUMENTS  X: particularly relevant A: technological background O: non-written disclosure P: intermediate document T: theory or principle underlying the invention E: conflicting application D: document cited in the application L: citation for other reasons
	A <u>GB - A - 841 091</u> (MOELLER & NEUMANN)		
A <u>DE - A - 2 218 281</u> (F. KRUPP)			
A <u>DE - A - 2 018 490</u> (VEREINIGTE ÖSTERREICHISCHE EISEN- UND STAHLWERKE AG) & <u>US - A - 3 600 926</u>			
<input checked="" type="checkbox"/> The present search report has been drawn up for all claims			&: member of the same patent family. corresponding document
Place of search Berlin		Date of completion of the search 21-07-1981	Examiner SCHLAITZ

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